

CPC**COOPERATIVE PATENT CLASSIFICATION****B61L**

GUIDING RAILWAY TRAFFIC; ENSURING THE SAFETY OF RAILWAY TRAFFIC (power supply lines for electrically-propelled vehicles B60M; vehicle signalling in general B60Q; brakes or auxiliary equipment B61H, B61K; point or crossing construction E01B; insulated rail joints [E01B 11/54](#); optical devices in general G02; controlling in general G05; electric communication technique H04)

B61L 1/00

Devices along the route controlled by interaction with the vehicle or vehicle train, { e.g. pedals}(detonators [B61L 5/20](#); operation of points or signals by passage of the vehicle [B61L 11/00](#), [B61L 13/00](#); central traffic control systems controlled by train [B61L 27/04](#); operation of gates, or gates and signals, by approaching vehicle [B61L 29/18](#))

- B61L 1/02 . Electric devices associated with track {e.g. rail contacts}
- B61L 1/025 .. {actuated by variation of resistance or by piezo-electricity}
- B61L 1/04 .. mechanically actuated by a part of the vehicle
- B61L 1/045 ... {actuated by fluid-pressure}
- B61L 1/06 .. actuated by deformation of rail; actuated by vibration in rail
- B61L 1/08 .. magnetically actuated; electrostatically actuated
- B61L 1/10 .. actuated by electromagnetic radiation; actuated by particle radiation

- B61L 1/12 . Electric devices associated with overhead trolley wires

- B61L 1/14 . Devices for indicating the passing of the end of the vehicle or vehicle train

- B61L 1/16 . Devices for counting axles; Devices for counting vehicles (counting moving objects in general [G06M](#))
- B61L 1/161 .. { characterised by the counting methods}
- B61L 1/162 .. { characterised by the error correction}
- B61L 1/163 .. { Detection devices}
- B61L 1/164 ... { Mechanical}
- B61L 1/165 ... { Electrical}
- B61L 1/166 ... { Optical}
- B61L 1/167 .. { Circuit details}
- B61L 1/168 .. { Specific transmission details}
- B61L 1/169 .. { Diagnosis}

- B61L 1/18 . Railway track circuits (automatically-operated track circuits specially adapted for section blocking for controlling traffic [B61L 23/00](#); rail joints [E01B 11/00](#))
- B61L 1/181 .. {Details}
- B61L 1/182 ... {Use of current of indifferent sort or a combination of different current types}
- B61L 1/183 {Use of means on the vehicle for improving short circuit e.g. in vehicles with rubber bandages}

- B61L 1/184 {Use of additional conductors for examining leakages between rails}
- B61L 1/185 . . . {Use of direct current}
- B61L 1/186 . . . {Use of rectified alternating current}
- B61L 1/187 . . . {Use of alternating current}
- B61L 1/188 . . . {Use of coded current}
- B61L 1/20 . . . Safety arrangements for preventing or indicating malfunction of the device, e.g. by leakage current, by lightning {remote indicating means for abnormal operations conditions [G08B 21/00](#), [G08B 23/00](#); detectors for indicating the overheating of axle bearings [B61K 9/00](#)}
- B61L 3/00** **Devices along the route for controlling devices on the vehicle or vehicle train, e.g. to release brake, to operate a warning signal**
- B61L 3/002 . . . {Recorders on the vehicle}
- B61L 3/004 . . . { Memory means reproducing during the running of the vehicle or vehicle train, e.g. smart cards}
- B61L 3/006 . . . { On-board optimisation of vehicle or vehicle train operation ([track-side optimisation of operation B61L 27/0027](#))}
- B61L 3/008 . . . { On-board target speed calculation or supervision ([track-side control of safe travel B61L 27/0038](#); [speed control circuitry B60L 3/08](#); [speed control of electric drives B60L 15/20](#))}
- B61L 3/02 . . . at selected places along the route, e.g. intermittent control {[simultaneous mechanical and electrical control](#)}
- B61L 3/04 . . . controlling mechanically {[arrangements of making elements acting directly on tread B60T 1/04](#)}
- B61L 3/06 . . . controlling by electromagnetic or particle radiation, e.g. by light beam ([using radio waves B61L 3/12](#))
- B61L 3/065 . . . {controlling optically}
- B61L 3/08 . . . controlling electrically
- B61L 3/10 . . . using current passing between devices along the route and devices on the vehicle train
- B61L 3/103 {[Details of current transmitting conductors or contact brushes](#)}
- B61L 3/106 { [with mechanically controlled electrical switch on the vehicle](#)}
- B61L 3/12 . . . using magnetic or electrostatic induction; using radio waves
- B61L 3/121 {[using magnetic induction](#)}
- B61L 3/125 { [using short-range radio transmission \(long-range radio transmission B61L 15/0027, B61L 27/0005\)](#)}
- B61L 3/126 { [Constructional details](#)}
- B61L 3/127 { [for remote control of locomotives \(remote control of locomotives within a train consist B61C 17/12\)](#)}
- B61L 3/128 { [for control of tilting trains by external control devices, e.g. by Eurobalise \(tilting details B61F 5/22\)](#)}
- B61L 3/14 . . . to cut-off the power supply to traction motors of electrically-propelled vehicles

- B61L 3/16 . Continuous control along the route
- B61L 3/18 .. using electric current passing between devices along the route and devices on the vehicle or vehicle train
- B61L 3/185 ... {using separate conductors}
- B61L 3/20 ... employing different frequencies or coded pulse groups {e.g. using currents carried by traction current (operating and signalling systems using network power supply [H02J 13/00](#))}
- B61L 3/22 .. using magnetic or electrostatic induction; using electromagnetic radiation
- B61L 3/221 ... {using track circuits}
- B61L 3/222 {Arrangements on the track only}
- B61L 3/225 ... {using separate conductors along the route}
- B61L 3/227 ... {using electromagnetic radiation}
- B61L 3/24 ... employing different frequencies or coded pulse groups {e.g. in combination with track circuits}
- B61L 3/243 {using alternating current}
- B61L 3/246 {using coded current}

- B61L 5/00** **Local operating mechanisms for points or track-mounted scotch-blocks** (track-mounted scotch-blocks per se [B61K](#)); **Visible or audible signals; Local operating mechanisms for visible or audible signals** ([B61L 11/00](#) takes precedence)

- B61L 5/02 . Mechanical devices for operating points or scotch-blocks {e.g. local manual control}
- B61L 5/023 .. {using funicular driving means}
- B61L 5/026 .. {fixing switch-rails to the driving means}

- B61L 5/04 . Fluid-pressure devices for operating points or scotch-blocks
- B61L 5/045 .. {using electrically controlled fluid-pressure operated driving means}

- B61L 5/06 . Electric devices for operating points or scotch-blocks {e.g. using electromotive driving means}
- B61L 5/062 .. {Wiring diagrams}
- B61L 5/065 .. {Construction of driving mechanism}
- B61L 5/067 .. {using electromagnetic driving means}

- B61L 5/08 . Underground actuating arrangements, e.g. for tramways

- B61L 5/10 . Locking mechanisms for points; Means for indicating the setting of points
- B61L 5/102 .. {Controlling electrically}
- B61L 5/105 .. {Controlling funicularly}
- B61L 5/107 .. {electrical control of points position}

- B61L 5/12 . Visible signals {(signalling means on the vehicle [B61L 15/00](#); signalling means for classification yards, or the like, with multiple indicating means [B61L 17/023](#); signalling means for road crossings [B61L 29/24](#); lighting in general [F21](#); visible signalling arrangements in general [G08B 5/00](#))}
- B61L 5/125 .. {Fixed signals, beacons, or the like}

- B61L 5/14 .. Form signals, e.g. semaphore arms **{(illumination for points, form signals [B61L 9/00](#))}**
- B61L 5/16 ... Local operating mechanisms for form signals
- B61L 5/161 {using electromotive driving means}
- B61L 5/162 {Wiring diagrams}
- B61L 5/163 {Driving mechanisms}
- B61L 5/165 {using electromagnetic driving means}
- B61L 5/166 {using electrically controlled gravity operated driving means}
- B61L 5/167 {using electrically controlled fluid-pressure operated driving means}
- B61L 5/168 {using funicular driving means}
- B61L 5/18 .. Light signals; Mechanisms associated therewith, e.g. blinders
- B61L 5/1809 ... {Daylight signals}
- B61L 5/1818 {using mobile coloured screen}
- B61L 5/1827 {using light sources of different colours and a common optical system}
- B61L 5/1836 {using light sources of different colours and separate optical systems}
- B61L 5/1845 {Optical systems, lenses}
- B61L 5/1854 {Mounting and focussing of the light source in a lamp, fixing means **(focussing of the light source in reflecting mirrors [F21M 3/02](#))}**}
- B61L 5/1863 {Lamp mountings on a mast}
- B61L 5/1872 {Mobile mounting arrangements on a mast; Arrangements for hoisting of the lamp along the mast}
- B61L 5/1881 {Wiring diagrams for power supply, control or testing}
- B61L 5/189 ... {using flashing light sources **(visible signalling in general using flashing light sources [G08B 5/38](#); thermal switches operating intermittently [H01H 61/06](#), [H01H 61/08](#))}**}
- B61L 5/20 . Audible signals, e.g. detonator {audible signalling}
- B61L 5/203 .. {Detonators; Track mounting means; Composition of the detonative product}
- B61L 5/206 .. {Signalling means for special purposes}
- B61L 5/22 .. Devices for initiating the release of detonators in a certain position of a signal
- B61L 5/24 .. Replacement of detonators
- B61L 7/00** **Remote control of local operating means for points, signals, or trackmounted scotch-blocks ([B61L 11/00](#) takes precedence; interlocking arrangements [B61L 19/00](#); transmission per se, see the relevant classes)**
- B61L 7/02 . using mechanical transmission; e.g. wire, lever
- B61L 7/021 .. {Driving wheels or supports for traction wires}
- B61L 7/022 .. {Guiding means or supporting foundations in beton}
- B61L 7/024 .. {Coupling for wires or traction bars}
- B61L 7/025 .. {Bracing or compensating arrangements}
- B61L 7/027 .. {Control levers}
- B61L 7/028 .. { Indicating or fixing arrangements in the event of breaking or tension difference of transmission wires for points, signals or similar}

- B61L 7/04 . using fluid-pressure transmitting
- B61L 7/06 . using electrical transmission
- B61L 7/061 .. {using electromotive driving means}
- B61L 7/062 ... {Wiring diagrams}
- B61L 7/063 ... {Construction of driving mechanism}
- B61L 7/065 .. {using electromagnetic driving means}
- B61L 7/066 .. {using electrically controlled fluid-pressure operated driving means}
- B61L 7/067 .. {Supply for electric safety arrangements}
- B61L 7/068 .. {Protection against eddy-currents, short-circuits, or the like, for electric safety arrangements}
- B61L 7/08 .. Circuitry
- B61L 7/081 ... {Direct line wire control}
- B61L 7/083 ... {Common line wire control using currents of different amplitudes, polarities, frequencies, or the like}
- B61L 7/085 ... {Common line wire control using synchronous distributors}
- B61L 7/086 ... {Common line wire control using relay distributors}
- B61L 7/088 ... {Common line wire control using series of coded pulses}
- B61L 7/10 ... for light signals, e.g. for supervision, back-signalling
- B61L 7/103 {Electric control of the setting of signals}
- B61L 7/106 {for form signals}

- B61L 9/00** **Illumination specially adapted for points, form signals, or gates** ([lighting in general F21](#))
- B61L 9/02 . non-electric
- B61L 9/04 . electric

- B61L 11/00** **Operation of points from the vehicle or by the passage of the vehicle**
- B61L 11/02 . Using mechanical interaction between vehicle and track
- B61L 11/04 .. Trailable point locks
- B61L 11/06 .. with fluid-pressure transmission
- B61L 11/08 . using electrical or magnetic interaction between vehicle and track
- B61L 11/083 .. {Magnetic control}

- B61L 13/00** **Operation of signals from the vehicle or by the passage of the vehicle**
- B61L 13/002 . {actuated by the passage of the vehicle}
- B61L 13/005 . {optically actuated}

- B61L 13/007 . {acoustically actuated}
- B61L 13/02 . using mechanical interaction between vehicle and track {(pedals [B61L 1/00](#))}
- B61L 13/04 . using electrical or magnetic interaction between vehicle and track {e.g. by conductor circuits using special means or special conductors}
- B61L 13/042 .. {using isolated rail sections}
- B61L 13/045 .. [N. using separated rail contacts, pedals or similar ([B61L 1/02](#) takes precedence)]
- B61L 13/047 .. {controlling inductively or magnetically}

- B61L 15/00** **Indicators provided on the vehicle or vehicle train for signalling purposes; {**
On-board control or communication systems}

- B61L 15/0009 . {wiring diagrams for start- or stop-signals on vehicles having one or more carriages and having electrical communication lines between the carriages}
- B61L 15/0018 . { Communication with or on the vehicle or vehicle train ([line transmission systems H04B 3/00](#))}
- B61L 15/0027 .. { Radio-based, e.g. using GSM-R}
- B61L 15/0036 .. { Conductor-based, e.g. using CAN-Bus, train-line or optical fibres}
- B61L 15/0045 . { Destination indicators, identification panels or distinguishing signs on the vehicles ([displaying in general G09F](#))}
- B61L 15/0054 . { Train integrity supervision, e.g. end-of-train (EOT) devices}
- B61L 15/0063 . { Multiple on-board control systems, e.g. "2 out of 3"-systems ([trackside multiple control systems B61L 27/0061](#))}
- B61L 15/0072 . { On-board train data handling ([trackside train data handling B61L 27/0077](#))}
- B61L 15/0081 . { On-board diagnosis or maintenance ([trackside diagnosis or maintenance B61L 27/0083](#))}
- B61L 15/009 . { On-board display devices}
- B61L 15/02 . Head or tail indicators, e.g. light

- B61L 17/00** **Switching systems for classification yards ([rail brakes B61K](#))**

- B61L 17/02 . Details, e.g. indicating degree of track filling
- B61L 17/023 .. {Signalling; Signals with multiple indicating means}
- B61L 17/026 .. {Brake devices}

- B61L 19/00** **Arrangements for interlocking between points and signals by means of a single interlocking device, { e.g. central control ([remote control B61L 7/00](#); [station block arrangements B61L 21/00](#))}**

- B61L 19/02 . Interlocking devices having mechanical or fluid-pressure operation
- B61L 19/023 .. {purely mechanical (control levers [B61L 7/027](#))}
- B61L 19/026 .. {using fluid-pressure operated points or signals}
- B61L 19/04 .. Detail- e.g. hand lever, back-signalling device

- B61L 19/06 . Interlocking devices having electrical operation
- B61L 19/08 .. Special arrangements for power supply for interlocking devices
- B61L 19/10 .. with mechanical locks
- B61L 19/12 ... Details
- B61L 19/14 .. with electrical locks
- B61L 19/16 ... Details

- B61L 21/00** **Station blocking between signal boxes in one yard** (interlocking between points and signals by means of a single interlocking device [B61L 19/00](#))

- B61L 21/02 . Mechanical locking and release of the route; Repeat locks; Coupling of semaphores
- B61L 21/04 . Electrical locking and release of the route; Electrical repeat locks {(central interlocking [B61L 19/00](#))}

- B61L 21/06 . Vehicle-on-line indication; Monitoring locking and release of the route
- B61L 21/065 .. {for signals, including signals actuated by the vehicle}

- B61L 21/08 . Order transmission and reception arrangements for giving or withholding permission

- B61L 21/10 . Arrangements for trains which are closely following one another (automatic central traffic control systems [B61L 27/04](#))

- B61L 23/00** **Control, warning, or like safety means along the route or between vehicles or vehicle trains**

- B61L 23/002 . {Control or safety means for heart-points and crossings of aerial railways, funicular rack-railway (points or safety systems for model railways [A63H](#); points, crossings or hearts for aerial railway, funicular rack railway [E01B 25/12](#))}
- B61L 23/005 .. {Automatic control or safety means for points for operator-less railway, e.g. transportation systems}

- B61L 23/007 . {Safety arrangements on railway crossings}

- B61L 23/02 . for indicating along the route the failure of brakes

- B61L 23/04 . for monitoring the mechanical state of the route
- B61L 23/041 .. { Obstacle detection}
- B61L 23/042 .. { Track changes detection}
- B61L 23/044 ... { Broken rails}
- B61L 23/045 ... { Rail wear}
- B61L 23/047 ... { Track or rail movements}

- B61L 23/048 . . . { Road bed changes, e.g. road bed erosion}
- B61L 23/06 . for warning men working on the route
- B61L 23/08 . for controlling traffic in one direction only (station blocking between signal boxes in one yard [B61L 21/00](#))
- B61L 23/10 . . manually operated {e.g. block arrangements}
- B61L 23/12 . . partly operated by train
- B61L 23/14 . . automatically operated
- B61L 23/16 . . . Track circuits specially adapted for section blocking
- B61L 23/161 {using current of indifferent sorte or a combination of different current types}
- B61L 23/163 {using direct current}
- B61L 23/165 {using rectified alternating current}
- B61L 23/166 {using alternating current}
- B61L 23/168 {using coded current}
- B61L 23/18 . . . specially adapted for changing lengths of track sections in dependence upon speed and traffic density
- B61L 23/20 . . . with transmission of instructions to stations along the route
- B61L 23/22 . for controlling traffic in two directions over the same pair of rails (station blocking between signal boxes in one yard [B61L 21/00](#))
- B61L 23/24 . . using token systems, e.g. train staffs, tablets
- B61L 23/26 . . with means for actuating signals from the vehicle or by passage of the vehicle
- B61L 23/28 . . using non-automatic blocking from a place along the route
- B61L 23/30 . . using automatic section blocking
- B61L 23/32 . . . with provision for the blocking or passing sidings
- B61L 23/34 . Control, warnings or like safety means indicating the distance between vehicles or vehicle trains by the transmission of signals therebetween

B61L 25/00 Recording or indicating positions or identities of vehicles or vehicle trains or setting of track apparatus

- B61L 25/02 . Indicating or recording positions or identities of vehicles or vehicle trains
- B61L 25/021 . . {Measuring and recording of train speed}
- B61L 25/023 . . { Determination of driving direction of vehicle or vehicle train}
- B61L 25/025 . . { Absolute localisation, e.g. providing geodetic coordinates}
- B61L 25/026 . . { Relative localisation, e.g. using odometer}
- B61L 25/028 . . { Determination of vehicle position and orientation within a train consist, e.g. serialisation}
- B61L 25/04 . . Indicating or recording train identities
- B61L 25/041 . . . {using reflecting tags}
- B61L 25/043 . . . {using inductive tags}
- B61L 25/045 . . . {using reradiating tags}
- B61L 25/046 . . . {using magnetic tags}

- B61L 25/048 . . . {using programmable tags}
- B61L 25/06 . Indicating or recording the setting of track apparatus, e.g. of points, of signals
- B61L 25/065 . . {for signalling systems on the vehicle using current conduction}
- B61L 25/08 . . Diagrammatic displays

- B61L 27/00** **Central traffic control systems; { Track-side control or specific communication systems}**

- B61L 27/0005 . { Details of track-side communication}
- B61L 27/0011 . { Regulation, e.g. scheduling, time tables}
- B61L 27/0016 . . { Preparing schedules}
- B61L 27/0022 . . { Following schedules}
- B61L 27/0027 . . { Track-side optimisation of vehicle or vehicle train operation (on-board optimisation [B61L 3/006](#))}
- B61L 27/0033 . . { Crew rosters and itineraries}
- B61L 27/0038 . { Track-side control of safe travel of vehicle or vehicle train, e.g. braking curve calculation (on-board target speed calculation and supervision [B61L 3/008](#))}
- B61L 27/0055 . { Testing or simulation}
- B61L 27/0061 . { Track-side multiple control systems, e.g. switch-over between different systems, "2 out of 3"-systems (on-board multiple control systems [B61L 15/0063](#))}
- B61L 27/0066 . . { Backup systems, e.g. switching when failures occur}
- B61L 27/0072 . . { Migration, e.g. parallel installations running simultaneously}
- B61L 27/0077 . { Track-side train data handling, e.g. vehicle or vehicle train data, position reports (on-board train data handling [B61L 15/0072](#))}
- B61L 27/0083 . { Track-side diagnosis or maintenance, e.g. software upgrades (on-board diagnosis or maintenance [B61L 15/0081](#))}
- B61L 27/0088 . . { for track-side elements or systems, e.g. trackside supervision of trackside control system conditions}
- B61L 27/0094 . . { for vehicles or vehicle trains, e.g. trackside supervision of train conditions}
- B61L 27/02 . Manual systems
- B61L 27/04 . Automatic systems, e.g. controlled by train; Change-over to manual control

- B61L 29/00** **Safety means for rail/road crossing traffic**

- B61L 29/02 . Guards or obstacles for preventing access to the route (cattle guards connected to the permanent way [E01B 17/00](#))
- B61L 29/023 . . {Special gates}
- B61L 29/026 . . . { Preventing access by means of obstacles raising across the route}
- B61L 29/04 . Gates for level crossings

- B61L 29/06 .. yielding to vehicles in one direction but operated in a different direction
- B61L 29/08 . Operation of gates; Combined operation of gates and signals
- B61L 29/10 .. Means for securing gates in their desired position
- B61L 29/12 .. Manual operation
- B61L 29/14 ... mechanically
- B61L 29/16 ... electrically
- B61L 29/18 .. Operation by approaching rail vehicle or rail vehicle train
- B61L 29/20 ... mechanically
- B61L 29/22 ... electrically
- B61L 29/222 {using conductor circuits with separate contacts or conductors}
- B61L 29/224 {using rail contacts}
- B61L 29/226 {using track-circuits, closed or short-circuited by train or using isolated rail-sections}
- B61L 29/228 {using optical means}
- B61L 29/24 . Means for warning road traffic that a gate is closed or closing, or that rail traffic is approaching, e.g. for visible or audible warning
- B61L 29/243 .. {Transmission mechanism or acoustical signals for gates}
- B61L 29/246 .. {Signals or brake- or lighting devices mounted on the road vehicle and controlled from the vehicle train}
- B61L 29/26 .. mechanically operated
- B61L 29/28 .. electrically operated
- B61L 29/282 ... {magnetic or inductive control by the vehicle}
- B61L 29/284 ... {using rail-contacts, rail microphones, or the like, controlled by the vehicle}
- B61L 29/286 ... {using conductor circuits controlled by the vehicle}
- B61L 29/288 ... {Wiring diagram of the signal control circuits}
- B61L 29/30 ... Supervision, e.g. monitoring arrangements
- B61L 29/32 ... Timing, e.g. advance warning of approaching train
- B61L 99/00 Subject matter not provided for in other groups of this subclass**
- B61L 2003/00 Devices along the route for controlling devices on the vehicle or vehicle train, e.g. to release brake, to operate a warning signal**
- B61L 2003/02 . at selected places along the route, e.g. intermittent control {simultaneous mechanical and electrical control}
- B61L 2003/08 .. controlling electrically
- B61L 2003/12 ... using magnetic or electrostatic induction; using radio waves
- B61L 2003/121 {using magnetic induction}
- B61L 2003/122 German standard for inductive train protection, called "Induktive Zugsicherung"[INDUSI]
- B61L 2003/123 French standard for inductive train protection, called "Contrôle de vitesse"

par balises" [KVB]

- B61L 2003/16 . Continuous control along the route
- B61L 2003/22 .. using magnetic or electrostatic induction; using electromagnetic radiation
- B61L 2003/221 ... {using track circuits}
- [B61L 2003/223](#) French cab signaling system, called "Transmission Voie-Machine" [TVM]
- B61L 2003/225 ... {using separate conductors along the route}
- [B61L 2003/226](#) German inductive continuous train control, called 'Linienzugbeeinflussung' [LZB]
- [B61L 2003/228](#) ... Constructional details

- B61L 2011/00 Operation of points from the vehicle or by the passage of the vehicle**

- B61L 2011/08 . using electrical or magnetic interaction between vehicle and track
- [B61L 2011/086](#) .. German radio based operations, called "Funkfahrbetrieb" [FFB]

- B61L 2019/00 Arrangements for interlocking between points and signals by means of a single interlocking device, { e.g. central control (remote control [B61L 7/00](#); station block arrangements [B61L 21/00](#));**

- B61L 2019/06 . Interlocking devices having electrical operation
- [B61L 2019/065](#) .. with electronic means

- B61L 2027/00 Central traffic control systems; { Track-side control or specific communication systems}**

- B61L 2027/0038 . { Track-side control of safe travel of vehicle or vehicle train, e.g. braking curve calculation (on-board target speed calculation and supervision [B61L 3/008](#));
- [B61L 2027/0044](#) .. using European Train Control System (ETCS)
- [B61L 2027/005](#) .. using Communication-based Train Control (CBTC)

- [B61L 2201/00](#) Control methods**

- [B61L 2201/02](#) . Fuzzy control

- [B61L 2205/00](#) Communication or navigation systems for railway traffic**

- [B61L 2205/02](#) . Global system for mobile communication - railways (GSM-R)
- [B61L 2205/04](#) . Satellite based navigation systems, e.g. GPS

- [B61L 2207/00](#) Features of light signals**

B61L 2207/02 . using light-emitting diodes (LEDs)

B61L 2210/00 Vehicle systems

B61L 2210/02 . Single autonomous vehicles

B61L 2210/04 . Magnetic elevation vehicles (maglev)